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# On Open and Collaborative Software Development in the DoD

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# On Open and Collaborative Software Development in the DoD

Software Engineering Institute  
Carnegie Mellon University  
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12 May 2010



**Software Engineering Institute**

**Carnegie Mellon**

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# Agenda

Open Source Software in the Department of Defense

Collaboration in the OSS Community

Drivers for Collaboration and Innovation

Collaboration in the DoD Community: Making Lightning Strike Twice



# Open Source Software in the Supply Chain

From various memorandums, OSS is recognized as a viable source for software that can be used in the US government and military systems

- OSS is COTS (per FAR)—DoNCIO
- Acquisition policies and guidelines still apply to OSS;
- OSS, like any software, must ensure that support is adequate;
- Use of OSS means adhering to OSS licensing—seek counsel;
- Addresses obligation to licensing (“Wennergren” subparagraph 2.e.);
- Suggest use of DoD Forges (“Wennergren” 2.f.);
- and (with clarifications<sup>†</sup>) use of OSS does not mean everything must be distributed back to community;

Onus is (*still*) on the user (*buyer beware*) to assess the “fitness for use” of OSS within the mission context

- E.g., National Security Telecommunications and Information Systems Security Policy (NSTISSP) No. 11

<sup>†</sup><http://gcn.com/articles/2008/10/08/pentagon-open-source-good-to-go.aspx>



# Open Source Software (beyond “Cheap” software)

Dan Risacher (ASD/NII, “open source evangelist to DoD”) in gcn.com, October 8, 2008 re: use of the term “open source software” applies to:

- Body of code of the software program—freely available
- Licensing—rules for lightly-controlled creation and usage
- Development methodology—encourages volunteers to help write the code

“He says...”	“We (the OSS community) hear...”
Freely available	open (for all to see), available (no barriers to access)
Lightly-controlled	promote continuous innovation and improvement and place no restrictions on how the software is used or by whom.
Encourages Volunteers	collaborative environment conducive to open debate, contributions, and (peer) support

†<http://gcn.com/articles/2008/10/08/pentagon-open-source-good-to-go.aspx>



# Why Shift to an OSS Development in the DoD?

Improve quality

Reduce time and cost

Reduce (or eliminate) restrictions on use

Encourage collaboration

Spark innovation

*Others...*

**Not about:**

**Opening up DoD software code to the world (practical restrictions on “freely available”)**



# Reaping the Benefits of an OSS-style Approach

## Improving quality

- Many “eyes”—better code, but more importantly better designs
- Open and observable code and design changes that are continually visible

## Encouraging collaboration and innovation

- Culture
- Infrastructure
- Incentives

## Achieving (broad) reuse

- Reduce onus on the code consumer to assess degree of fit (plagues OSS)
- **Not** “*Not Invented Here*” should be rewarded and expected



# Blasts from the Past

## Software Reuse Libraries and Repositories

- PACT (Project for the Advancement of Coding Techniques)
- SHARE, IBM Users Group
- SIMTEL20
- BSD, GNU
- DoD efforts: STARS, STARS SCAI, ASSET, CARDS, PRISM, DSRS, ELSA, DSSA ADAGE, and RICC
- Proprietary “software component marketplace”

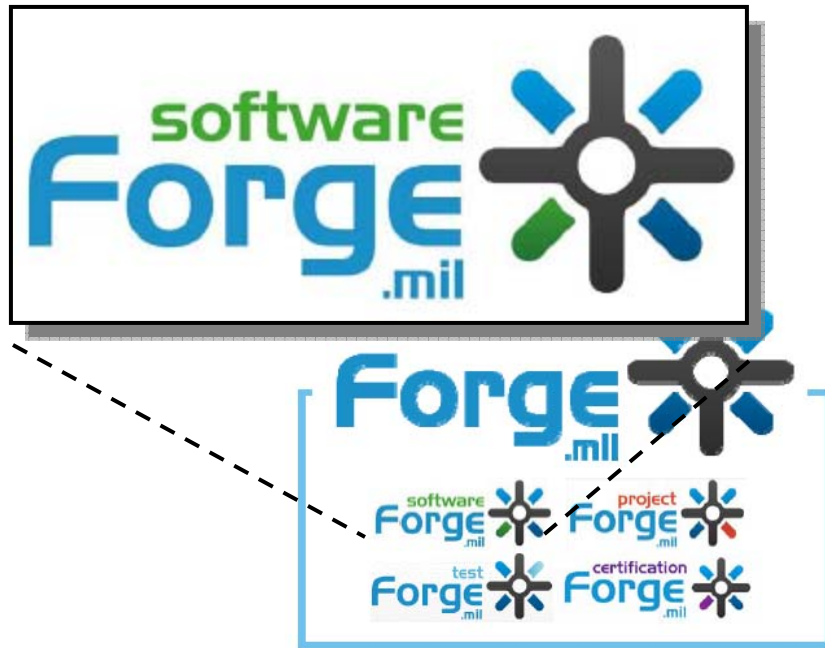
## Lessons

- Quality arbitration: flea market to few precious selections
- Search/browse: no longer a resource and computational problem: Google!
- Context and Semantics: relationship between problem domain and artifacts
  - Underpinnings of Software Product Lines (SPL)





# New, Initial Steps...



From “Introduction to Forge.mil”, 26 MAR 2009, online CollabNET and Carahsoft web seminar hosted by Rob Vietmeyer and Guy Martin

Based on TeamForge from Collab.NET

Modeled after ‘Internal Forge’ industry concept

- Inner source or corporate source software

Community is primarily DoD employees and its suppliers

- Not quite 100% “open”

Project in Software Forge.mil:


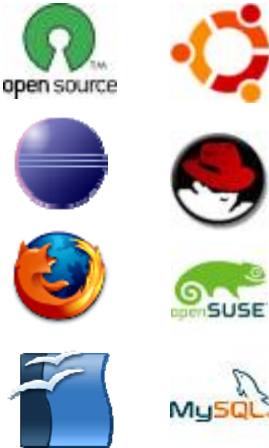

- Open source of DoD Community source license
- Not a ‘fork’ of an open source project or duplicate of an existing Forge project



# Culture of Collaboration in the OSS Community

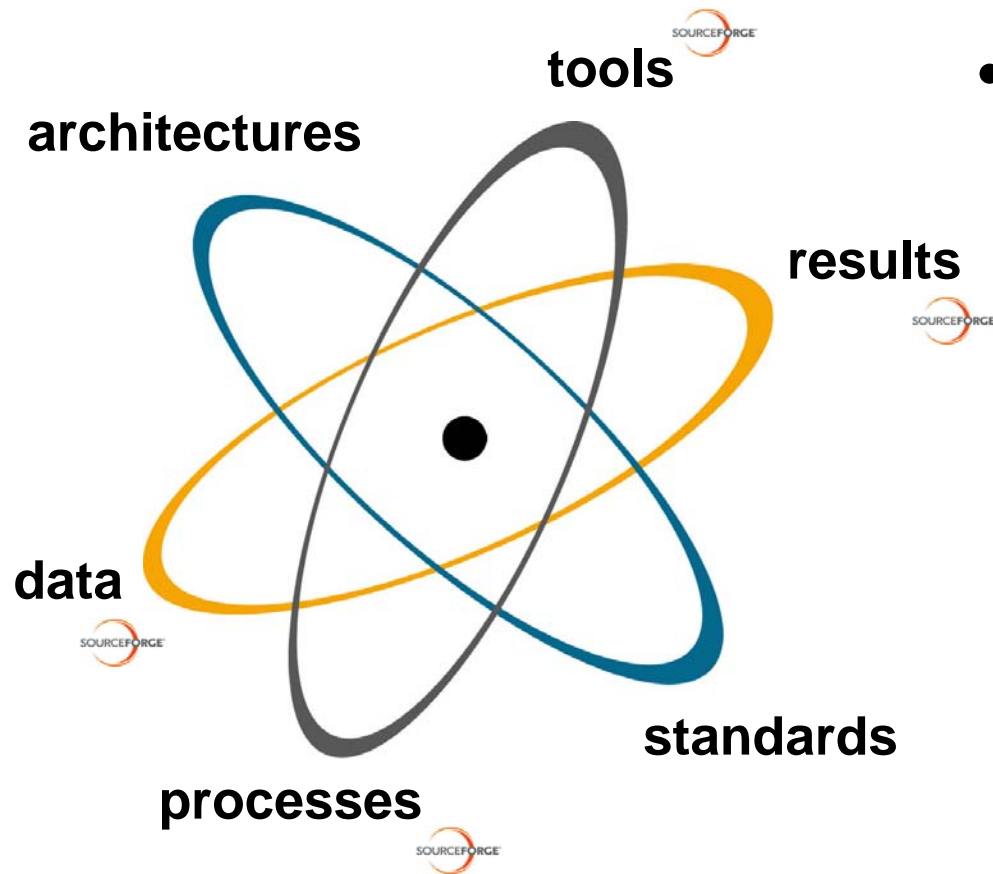


# Evolving Motivations and Incentives

	Generation Zero	FSF Generation	OSI Generation	eScience Generation
Examples	<p>PACT SHARE Various Publications</p>			
Motivation(s)	<ul style="list-style-type: none"> <li>• Scientific collaboration and sharing</li> <li>• Altruism</li> </ul>	<ul style="list-style-type: none"> <li>• Scratch an “Itch”</li> <li>• Meritocracy</li> </ul>	<ul style="list-style-type: none"> <li>• Marketplace Dominance</li> <li>• Competition</li> </ul>	<ul style="list-style-type: none"> <li>• Solve Hard Problems</li> </ul>



# Collaboration “Fusion”

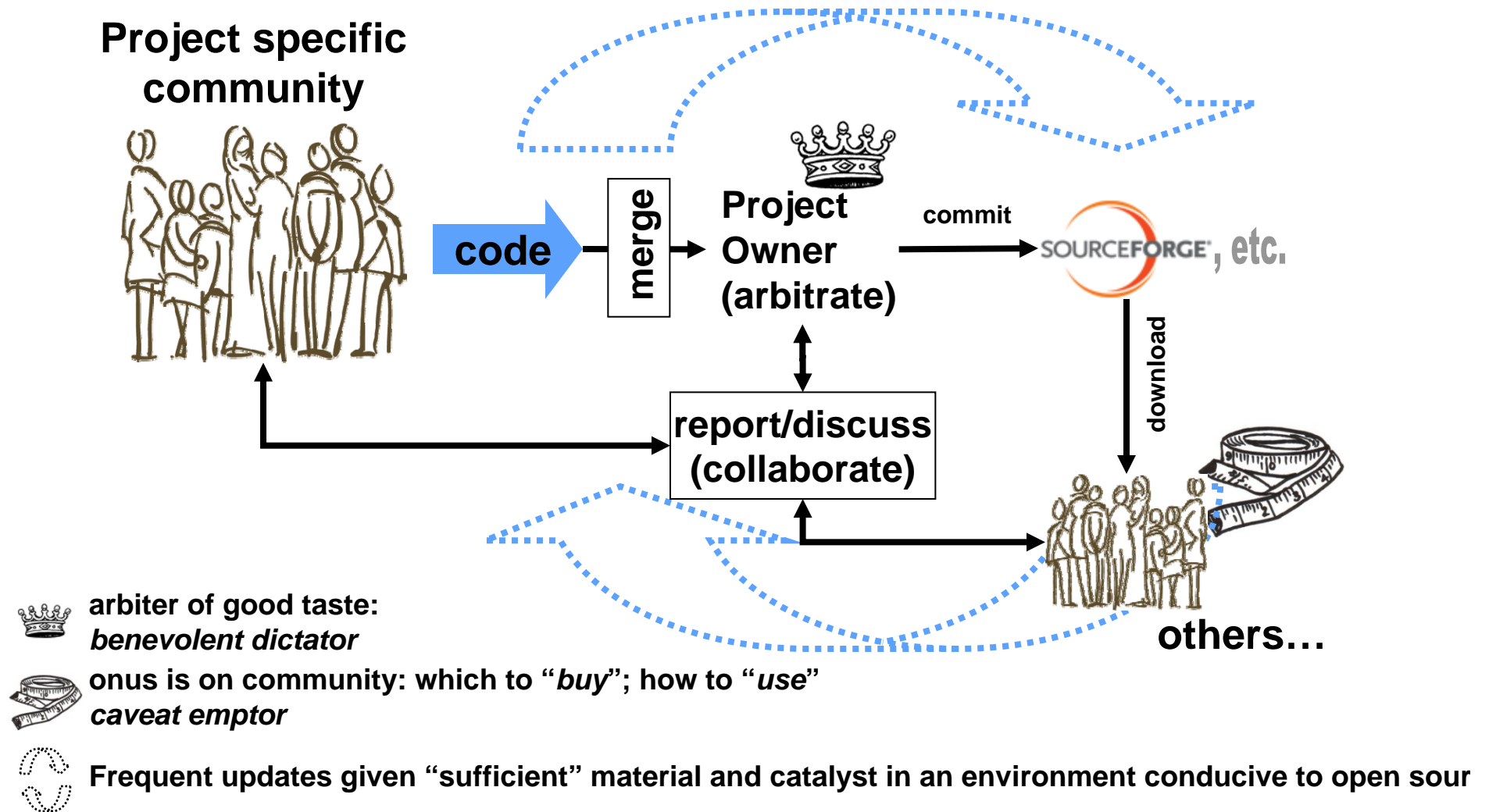


- Here *all* elements are *open*:
  - Architectures
  - Standards
  - Tools (incl. code)
  - Data
  - Results
  - Software engineering processes

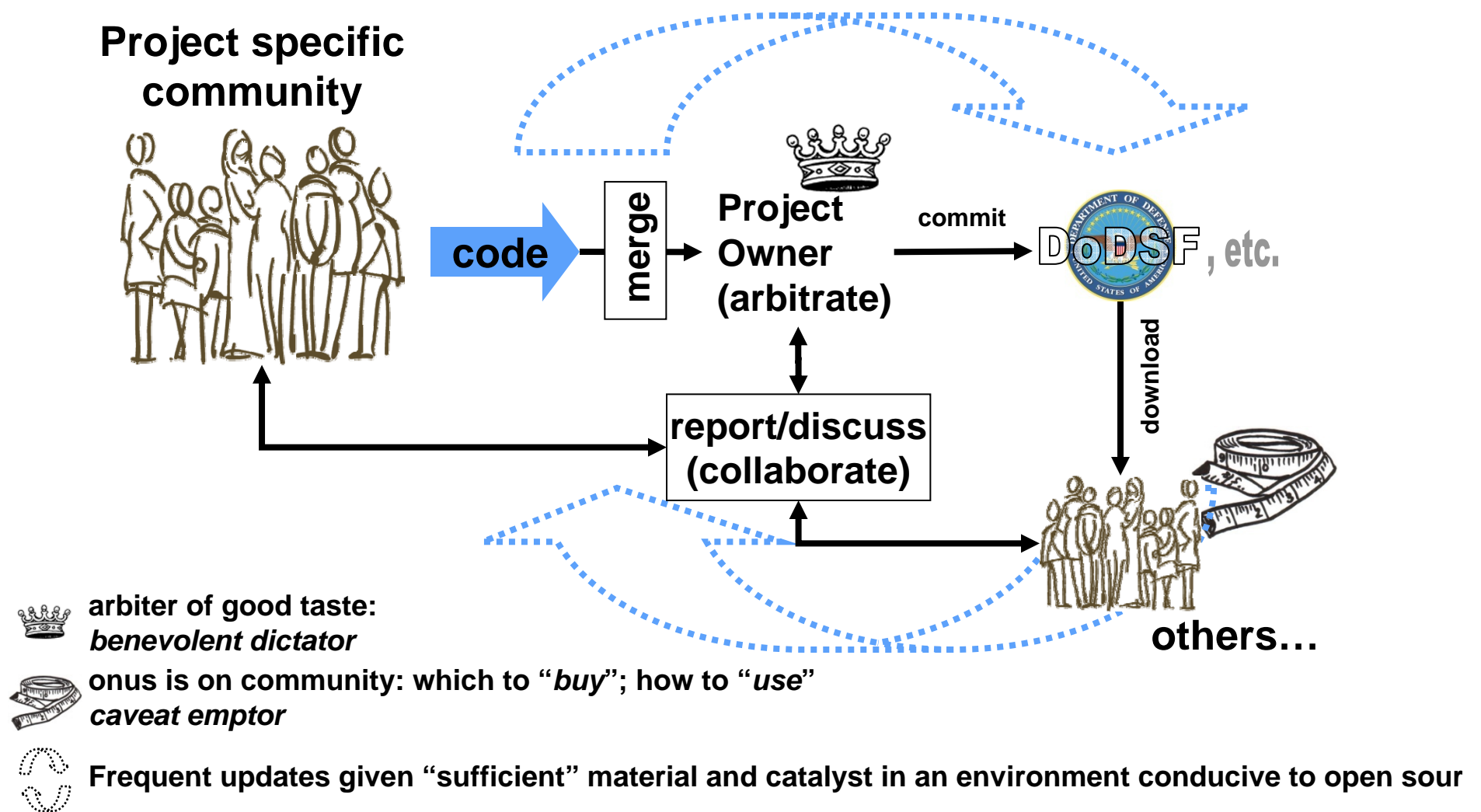
Collaboration fusion occurs when the right catalyst (incentive) is used to initiate and sustain an open and collaborative community sharing of all artifacts



# Infrastructures Supporting OSS Communities

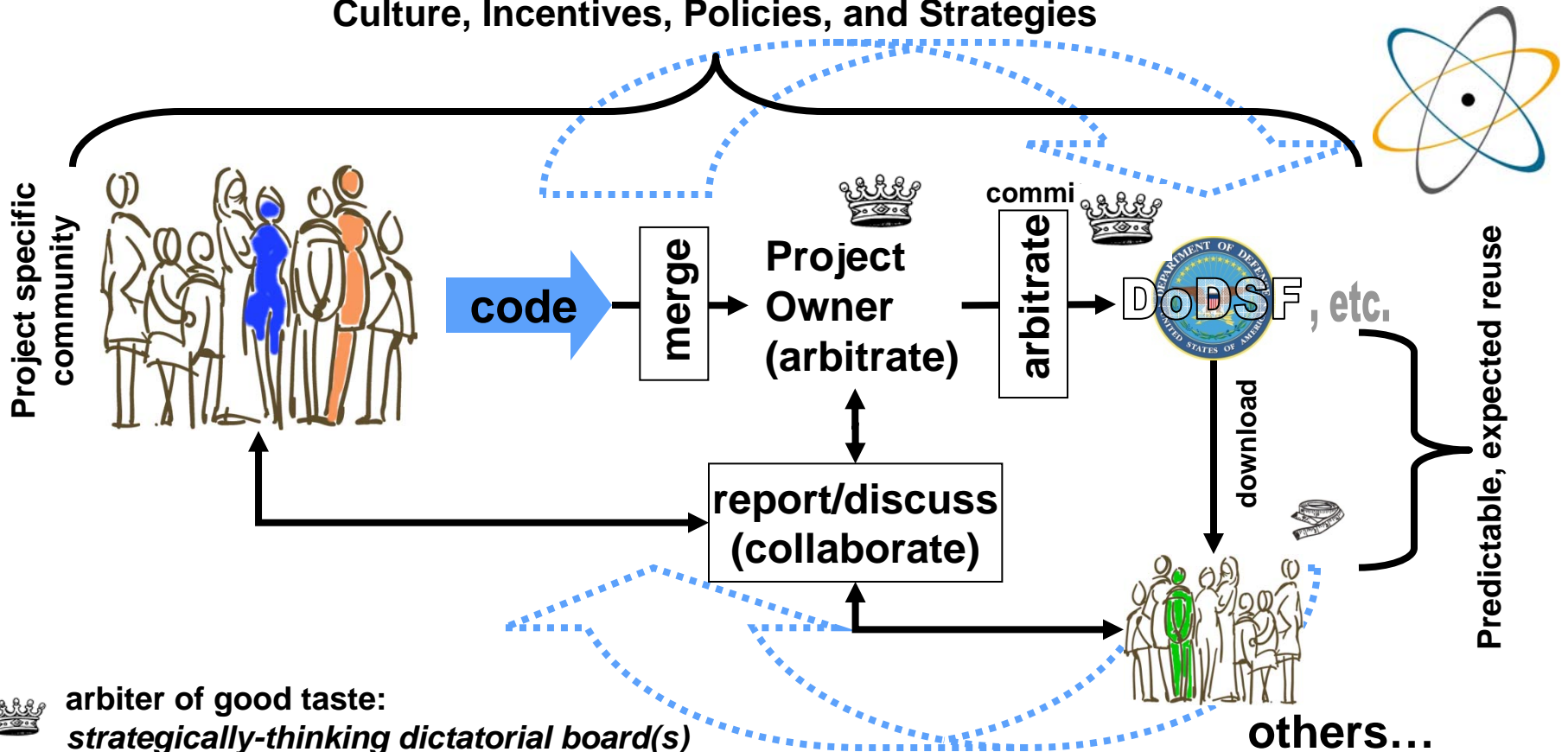


# Infrastructures Supporting OSS Communities



# Infrastructures Supporting DoD Communities

Culture, Incentives, Policies, and Strategies



arbiter of good taste:  
*strategically-thinking dictatorial board(s)*



lessen onus is on community: easy to “find”; easy to “use”  
*caveat venditor (“let the seller beware”)*



Frequent updates given “sufficient” material and catalyst in an environment conducive to open sour



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# Making Lightning Strike Twice

OSS works today because of the culture, environment, and motivation

- Founding by a loose set principles and rules (formalized through licenses today) which guide behavior to achieve freely available, lightly-controlled software developed in a collaborative manner
- Itself informed by centuries of communities creating new knowledge and building off each others work

What would such principles and rules look like in a “gated” DoD OSS community?

- Itself informed by 200 years of contracting, procurement, and competition?

What is needed to foster the behavior the DoD wants to engender?

- What can “it” control?
- What control must “it” relinquish?

***“Open source is not for everyone, but if you have the right attitude then it can be a major success factor for your project. You must be willing to give up control and share decision making with your community. Working together you can create something much better than you could by working alone. Good luck!”***

**—Goldman & Gabriel, IHE**





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